

# BPI BUILDING ANALYST TECHNICIAN JOB TASK ANALYSIS

<b>Domain 1: Building Science</b>	
<b><i>Task 1: Energy and Thermodynamics</i></b>	
<b>Knowledge of:</b>	
•	thermal resistance/transmittance including conversions: R-values, U-factors
•	latent and sensible heat
•	thermal bridges
•	pressure boundaries
•	thermal boundaries
•	associated terms: conduction, convection, radiation
•	factors affecting human thermal comfort
<b><i>Task 2: Combustion Science</i></b>	
<b>Knowledge of:</b>	
•	the principles of combustion
•	combustion analysis
•	carbon monoxide (CO) testing of combustion appliances
•	combustion appliance venting configuration basics
•	combustion air
•	initial (baseline) Combustion Appliance Zone (CAZ) pressure
•	CAZ depressurization
•	combustion appliance spillage
•	combustion appliance backdrafting
<b><i>Task 3: Moisture and Psychrometrics</i></b>	
<b>Knowledge of:</b>	
•	moisture transport mechanisms: airflow, diffusion, capillary action
•	permeability of materials
•	psychrometric basics
<b><i>Task 4: Building Airflow</i></b>	
<b>Knowledge of:</b>	
•	airflow in buildings and associated terms
•	stack effect
•	wind effect
•	exfiltration/infiltration
•	ducts and associated terms
•	mechanically-induced pressures
<b><i>Task 5: Mechanical Systems</i></b>	
<b>Knowledge of:</b>	
•	natural and mechanical ventilation systems
•	input and output capacity
•	system efficiencies (AFUE, SEER, HSPF, EF, etc.)
<b>Domain 2: Buildings &amp; Their Systems</b>	
<b><i>Task 1: Building Components and Construction</i></b>	
<b>Knowledge of:</b>	
•	vapor control layer
•	fenestration types, characteristics, and condition
•	interstitial cavities and bypasses
•	the interaction between mechanical systems, envelope systems, and occupant behavior
•	radiant energy impact of building orientation and shading
•	common thermal boundary deficiencies in basements, crawlspaces and slabs
•	infiltration points from attached garages

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<b>Skill in:</b>
<ul style="list-style-type: none"> <li>• attention to details</li> </ul>
<b>Ability to:</b>
<ul style="list-style-type: none"> <li>• identify basic structural components of residential construction</li> <li>• identify basic exterior moisture control strategies/components</li> <li>• identify the amperage of the main electrical service panel</li> </ul>
<b><i>Task 2: Mechanical Equipment</i></b>
<b>Knowledge of:</b>
<ul style="list-style-type: none"> <li>• distribution systems</li> <li>• basic heating/cooling equipment components, controls, and operation</li> <li>• consequences involved with distribution systems outside the thermal envelope</li> <li>• basic DHW equipment components, controls, and operation</li> </ul>
<b>Skill in:</b>
<ul style="list-style-type: none"> <li>• attention to details</li> </ul>
<b>Ability to:</b>
<ul style="list-style-type: none"> <li>• identify common mechanical safety controls</li> </ul>
<b><i>Task 3: Building Thermodynamics</i></b>
<b>Knowledge of:</b>
<ul style="list-style-type: none"> <li>• factors that affect insulation performance</li> <li>• heat gain/loss</li> </ul>
<b>Skill in:</b>
<ul style="list-style-type: none"> <li>• attention to details</li> <li>• communication</li> </ul>
<b>Ability to:</b>
<ul style="list-style-type: none"> <li>• identify existing thermal boundary</li> <li>• discuss the vapor control layer and its function</li> </ul>
<b><i>Task 4: Building Airflow</i></b>
<b>Knowledge of:</b>
<ul style="list-style-type: none"> <li>• whole-building and source control ventilation</li> <li>• factors affecting ventilation system performance</li> <li>• interactions between mechanical ventilation and building exfiltration/infiltration</li> </ul>
<b><i>Task 5: Indoor Air Quality</i></b>
<b>Knowledge of:</b>
<ul style="list-style-type: none"> <li>• the concepts of IAQ</li> <li>• moisture sources</li> <li>• radon</li> <li>• mold-like substances</li> <li>• asbestos-like material</li> <li>• lead</li> <li>• common pests</li> </ul>
<b>Skill in:</b>
<ul style="list-style-type: none"> <li>• attention to details</li> </ul>
<b>Ability to:</b>
<ul style="list-style-type: none"> <li>• identify interior moisture sources throughout the building</li> </ul>
<b><i>Task 6: Renewables</i></b>
<b>Skill in:</b>
<ul style="list-style-type: none"> <li>• attention to details</li> </ul>
<b>Ability to:</b>
<ul style="list-style-type: none"> <li>• identify renewable systems and related equipment</li> </ul>

# BPI BUILDING ANALYST TECHNICIAN JOB TASK ANALYSIS

<b>Domain 3: Testing and Data Collection</b>	
<b><i>Task 1: Building and Components</i></b>	
<b>Knowledge of:</b>	
•	the key aspects and purpose of the pressure boundary
•	the key aspects and purpose of the thermal boundary
•	relationship between the pressure and thermal boundaries
<b>Skill in:</b>	
•	measuring
•	basic math
•	attention to details
<b>Ability to:</b>	
•	accurately measure the perimeter of the house
•	identify any potential hazards that would prevent pressure diagnostic testing
•	identify the conditioned space of the home
•	measure and calculate the area and volume of a house
<b><i>Task 2: Combustion Safety Testing</i></b>	
<b>Knowledge of:</b>	
•	CO sources
•	conditions that can adversely affect baseline pressure differential measurement, and corrective actions that will establish a stable baseline pressure under adverse conditions
•	protocol for testing multiple combustion appliances sharing chimney and/or venting system
<b>Skills in:</b>	
•	attention to detail
•	set-up of test/diagnostic equipment
•	use of test/diagnostic equipment
<b>Ability to:</b>	
•	visually assess and discuss condition of combustion appliance venting
•	set up home properly for combustion appliance zone (CAZ) depressurization testing
•	measure baseline pressure differential
•	summarize the conditions that cause the greatest CAZ depressurization
•	measure, record CAZ pressure differential measurements, and achieve the greatest CAZ depressurization given the weather/temperature conditions at the time
•	check for spillage in one appliance under greatest CAZ depressurization and state time limits for spillage testing based on ANSI/BPI-1200
•	determine if the appliance passes the spillage test
•	identify appropriate action levels for spillage based on ANSI/BPI-1200
•	identify the combustion appliance zones within the home
<b><i>Task 3: Carbon Monoxide Testing</i></b>	
<b>Knowledge of:</b>	
•	protocol for measuring flue gas CO in direct-vented and power-vented appliances
<b>Skill in:</b>	
•	attention to details
•	set-up of test/diagnostic equipment
•	use of test/diagnostic equipment
<b>Ability to:</b>	
•	prepare combustible gas and CO measurement instruments for use
•	test indoor ambient CO levels and compare results to ANSI/BPI-1200
•	correctly measure flue gas CO in one combustion appliance

## BPI BUILDING ANALYST TECHNICIAN JOB TASK ANALYSIS

•	monitor ambient CO levels in the CAZ during entire combustion safety testing
•	visually inspect and correctly perform a CO test on a gas oven, and demonstrate knowledge of correct action levels in accordance with ANSI/BPI-1200
•	identify appropriate flue gas CO action levels based on ANSI/BPI-1200
<b>Task 4: Combustible Fuel Leak Testing</b>	
<b>Knowledge of:</b>	
•	fossil fuel delivery systems and their components
•	concerns about flexible connectors
<b>Skill in:</b>	
•	attention to details
•	set-up of testing/diagnostic equipment
•	use of test/diagnostic equipment
<b>Ability to:</b>	
•	test indoor ambient combustible gas levels and compare results to ANSI/BPI-1200
•	inspect fuel lines for deficiencies; test for and identify natural gas/propane leaks, and apply appropriate action levels based on industry standards
•	inspect oil line and identify fuel oil leaks and apply appropriate action levels based on industry standards
<b>Task 5: Blower Door Testing</b>	
<b>Knowledge of:</b>	
•	the difference between pressurization and depressurization testing
<b>Skill in:</b>	
•	attention to details
•	set-up of test/diagnostic equipment
•	use of test/diagnostic equipment
<b>Ability to:</b>	
•	set combustion appliances to pilot or disable them to ensure they do not fire during the blower door test
•	verify solid fuel appliances will not be operational during testing
•	appropriately prepare house for blower door testing
•	properly set up blower door frame, shroud, fan and manometer for blower door testing
•	measure baseline pressure differential and take an accurate CFM50 measurement
•	identify priority air leakage areas by conducting room by room inspection
•	perform pressure pan testing in a location other than ductwork
•	perform zonal pressure testing between conditioned and unconditioned space
<b>Task 6: Mechanical Ventilation</b>	
<b>Knowledge of:</b>	
•	equipment needed for measuring fan flow rate
<b>Skill in:</b>	
•	measuring
•	basic math
•	use of test/diagnostic equipment
<b>Ability to:</b>	
•	document existing mechanical ventilation system type/s and location/s, and ability to identify the existing type of fan control, and assess the condition of the mechanical ventilation ductwork
•	determine volume of space affected by mechanical ventilation
•	measure exhaust fan flow rate

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<b><i>Task 7: Assessment of Existing Insulation</i></b>	
<b>Knowledge of:</b>	
•	insulation types
•	how to safely measure enclosed cavity depth
<b>Skill in:</b>	
•	measuring
•	attention to details
<b>Ability to:</b>	
•	determine open cavity insulation thickness, type, rated R-value, and condition, and identify framing member dimensions
•	determine closed cavity insulation thickness, type, and identify framing member dimensions
•	rate insulation conditions in accordance with industry standards
<b><i>Task 8: Heating and AC Distribution Systems</i></b>	
<b>Knowledge of:</b>	
•	conditions that can impact performance of supply register or return grille, and conditions that can affect hydronic baseboards
•	the purpose of duct pressurization testing
<b>Skill in:</b>	
•	measuring
•	set-up of test/diagnostic equipment
•	use of test/diagnostic equipment
<b>Ability to:</b>	
•	perform blower door assisted pressure pan testing of ducted distribution systems
•	conduct room to room pressure differential diagnostics with air handler in operation
•	determine the distribution system type, configuration and condition; insulation type, rated R-value and condition; and identify supplies vs. returns
•	measure size of supply register and return grille
•	determine location and condition of filter
•	collect appropriate data from manufacturer's data plate
<b><i>Task 9: Domestic Hot Water</i></b>	
<b>Knowledge of:</b>	
•	domestic hot water (DHW) conservation strategies
<b>Skill in:</b>	
•	attention to details
<b>Ability to:</b>	
•	identify water heater type, size, BTU/wattage input, venting type and fuel source
•	determine if the domestic water heating appliance poses any health and safety concerns
•	determine existing domestic water heating appliance insulation, existing pipe insulation type, location, and condition
<b><i>Task 10: Appliances</i></b>	
<b>Knowledge of:</b>	
•	appropriate information to collect from homeowners regarding appliances and lighting
<b>Skill in:</b>	
•	attention to details
<b>Ability to:</b>	
•	locate manufacturer's data plate and record appropriate data